SPACEPORT INTEGRATED MASTER SCHEDULE (SIMS)

KSC-PLN-5000_SIMS

Revision A

SPACEPORT INTEGRATED MASTER SCHEDULE

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Change Log

Date	Revision	Description
05/31/2016	Basic	This document is developed as a result of the 2015 KSC reorganization.
08/31/2017	A	This document was revised for the following reasons: • Resolution of previously documented TBD 5.1 • Updated Figure 1, Schedule Information Flow Diagram to reflect current-day process • Deleted all references to the Weekly Spotlight chart within the KSOP briefing due to change in KSOP briefing process • Deleted Appendices A, B, and C, all examples of the SIMS integration tools; no longer necessary

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1.0 INTRODUCTION

1.1 Purpose

The Kennedy Space Center (KSC) Multiuser Spaceport (Spaceport) supports Government and commercial space launch users and providers. This plan documents the process and supporting products in the planning of operations and activities for all Spaceport users, ensuring efficient use of resources and providing insight into potential resource conflicts. Specifically, as a result of Spaceport users having this situational awareness, the spaceport integration process:

a. Aids in the prevention of one customer's operations affecting the operations or safety of another customer

b. Provides planning products to Spaceport users related to National Aeronautics and Space Administration (NASA) shared resource utilization

c. Informs all Spaceport users of planned Spaceport activities to minimize operational conflicts and supports efficient planning

d. Promotes situational awareness of Spaceport operations activities to support:

   (1) Efficient and effective Spaceport management

   (2) Visibility of KSC daily risk posture and resource commitment

   (3) KSC Senior management

   (4) First responders

1.2 Scope

This plan applies to all Spaceport users. This plan does not generally apply to operations which are contained within a commercial or program-managed facility that do not impact operations beyond its boundaries. Spaceport users will continue to integrate all operations within their assigned facilities unless agreed otherwise.

The Customer Services and Integration Branch retains overall responsibility for the contractor-maintained SIMS. Insight for the SIMS comes from access and review of products and services created by Spaceport users such as, but not limited to:

a. Replies to the SIMS data call via e-mail

b. Active participation in the SIMS Coordination (SIMS Coord) Meeting

c. Internal schedule reviews

d. Task Order Requests (TOR) and Task Plans when submitted for reimbursable services

e. Review of KSC Daily News

f. Review of contractor-provided Transport Log

g. Review of NASA program weekly notes and other publications

h. Baseline and updated concepts of operations submitted in accordance with agreements

i. Baseline and updated program plans

j. Meetings and teleconferences with the Eastern Range (ER) Scheduling Office

The SIMS provides situational awareness to Spaceport users for operations which exceed, or could potentially exceed, operational facility boundaries and operations or situations which could impact multiple entities across the Spaceport. Typically, these operations include:

a. Operations which extend beyond a Spaceport user's physical facility boundaries or sited area, operations whose hazardous attributes or facility restrictions prevent access to a facility or Spaceport user's area by other users, or operations with hazards that could propagate outside of a facility or the Spaceport user's boundaries in the event of a mishap. Some specifics follow:

   (1) Launch, landing, and/or recovery operations (including operations from Cape Canaveral Air Force Station)

   (2) Major operations testing (e.g., wet dress rehearsal, launch abort testing, static fire tests)

   (3) Use of cryogenic fuels, hypergolic materials, or ammonia fluids requiring a 50 feet (ft.) or greater safety clear

   (4) Ordnance, explosives, or solid propellant operations requiring a 50 ft. or greater safety clear

   (5) Nuclear materials operations

   (6) Unmanned aircraft systems operations over areas outside a Spaceport user's real property boundary

   (7) Operations utilizing Class III and IV lasers unless hazards are confined to a specific location within a facility or facility boundary

   (8) Significant flight hardware milestones and first-time major events (e.g., flight hardware integration, facility readiness to support operations, award of certificate of occupancy, or major ground system acceptance/activation)

   (9) Other operations or events that could potentially create adverse impacts to Spaceport users

b. Prescribed burn operations

c. Specific routing of flight hardware or significant science arriving on, transiting through, or departing from the Spaceport with air quality concerns or restrictions

d. Instances of increased need for awareness of facility air quality as a result of the presence of flight hardware or significant science, with documented air quality restrictions, in specific facility locations; includes instances when facility infrastructure failure causes a change in posture from the original requirement

e. Flight hardware or ground support equipment deliveries to the Spaceport that could impact Spaceport users' operations as well as hardware moves occurring on or through the Spaceport which require permitting; includes movement of any load that exceeds road/bridge width or weight restrictions

f. Operations that require large-volume usage of the NASA nitrogen and helium pipelines (e.g., launch or wet dress rehearsal)

g. Road blocks or road closures

h. Operations that require one of the FAA defined restricted airspace designations (R2932, R2933, R2934) to be called up for use

i. Major utility outages affecting multiple facilities

j. Construction activities or large construction equipment/material moves that could impact Spaceport users' operations

k. Operations requiring radio frequency (RF) silence or RF restrictions

l. Public affairs/media events that have the potential to impact Spaceport users' operations

m. NASA-required maintenance activities, performed by NASA contractors, which are contained within commercial-managed facility boundaries

1.3 Applicability

This plan is applicable to all Spaceport users. Spaceport Integration and Services (SI) and their support contractor utilizes this plan to produce the SIMS schedule, as well as other operational planning tools. The objective of these products is to assist Spaceport users in schedule development with the intent to avoid or minimize impacts associated with the operation of a multiuser spaceport.

2.0 SIMS INTEGRATION TOOLS

The SIMS suite of tools provides a consolidated synopsis of significant activities and events involving all users across the Spaceport. The SIMS presents a high-level view of operations at the Spaceport and serves as an operational planning and situational awareness tool. Additional graphical tools provide a visual overview of significant work and potential impacts throughout the Spaceport. All of the integration tools are accessible from the Employee Resources section of the Kennedy Communicator, the KSC intranet home page. These tools and much more may also be accessed from the Spaceport Integrated Master Scheduling Office Web page. The Customer Services and Integration Branch retains overall responsibility for these contractor-maintained spaceport integration tools.

2.1 SIMS

The primary SIMS product is a Gantt chart-style schedule. Operations activities are primarily organized by geographical area and include the following areas: KSC General, Launch Complex 39, Vehicle Processing and Support Area, Shuttle Landing Facility, and Industrial Area. Although the SIMS maintains six months of data, the focus is on the upcoming three months. In

addition, shorter-term schedules can be included to show higher fidelity views of operations. The SIMS is the master integration tool that maintains data to support other spaceport integration tools.

2.2 Kennedy Spaceport Operations Picture (KSOP)

The KSOP is a key part of the overall Spaceport integration effort. The KSOP provides KSC senior managers with a distilled view of Spaceport operations in the context of the overall Spaceport schedule. SI presents the KSOP at the weekly KSC Senior Staff Meeting. The KSOP consists of two major components: a two-week look-ahead at significant operations and a year-long look at major events.

The KSOP two-week calendar depicts content described in the scope of this document, section 1.2, and is derived from the SIMS. The focus is on discrete events that occur in the timeframe, not on continuing activities, that extend across multiple two-week periods. Additional charts may be added to further explain operations outlined on the two-week chart.

The KSOP year-long timeline depicts major events only, typically including launches, range events, and major milestones.

2.3 Geospatial Spaceport Integrated Master Schedule (GeoSIMS)

The GeoSIMS is a visualization tool that supports Spaceport integration by depicting a geographical representation of operations events overlaid on a map of the Spaceport. Each GeoSIMS image represents a single day. Users operate a timeline slide bar tool to advance the date so the next day's events may be viewed. GeoSIMS's primary purpose is for operational planning and situational awareness of operations and it may help identify conflicts associated with operations in close proximity to each other. For example, the graphics include exclusion zones for launches, active prescribed burn areas, and travel paths for hardware, including a prescribed-burn no-smoke buffer. Typically, a two-week window of daily maps is available for viewing.

2.4 SI-Television (TV)

SI-TV is in development as the newest addition to the suite of SIMS Integration Tools. The purpose of SI-TV is to effectively communicate information regarding what is going on around the Spaceport, in a manner that is open to all Spaceport users. Once implemented, information displayed may include, but is not limited to:

a. Screen-shots of GeoSIMS

b. SIMS schedule

c. Weather advisories/watches/warnings

d. Weather Radar

e. Operations updates (e.g., Falcon 9 Static Fire Test, Launch, prescribed burns)

f. Safety concerns

g. Security concerns

h. Emergency Operations Center messages

3.0 SIMS UPDATE PROCESS

3.1 Schedule Input Solicitation

The process to provide information to update the SIMS currently operates on a weekly cycle. Spaceport users provide operations scheduling information weekly, as required. Customer Services and Integration Branch Customer Advocates assist in gathering the information and coordinating with Spaceport users to ensure information is relayed in a timely manner. The Master Integrator, within the Customer Services and Integration Branch, will oversee the contractor's process to incorporate the information into the SIMS, GeoSIMS, and SI-TV. The Contractor will then solicit information for the next week to continue the cycle. See figure below.

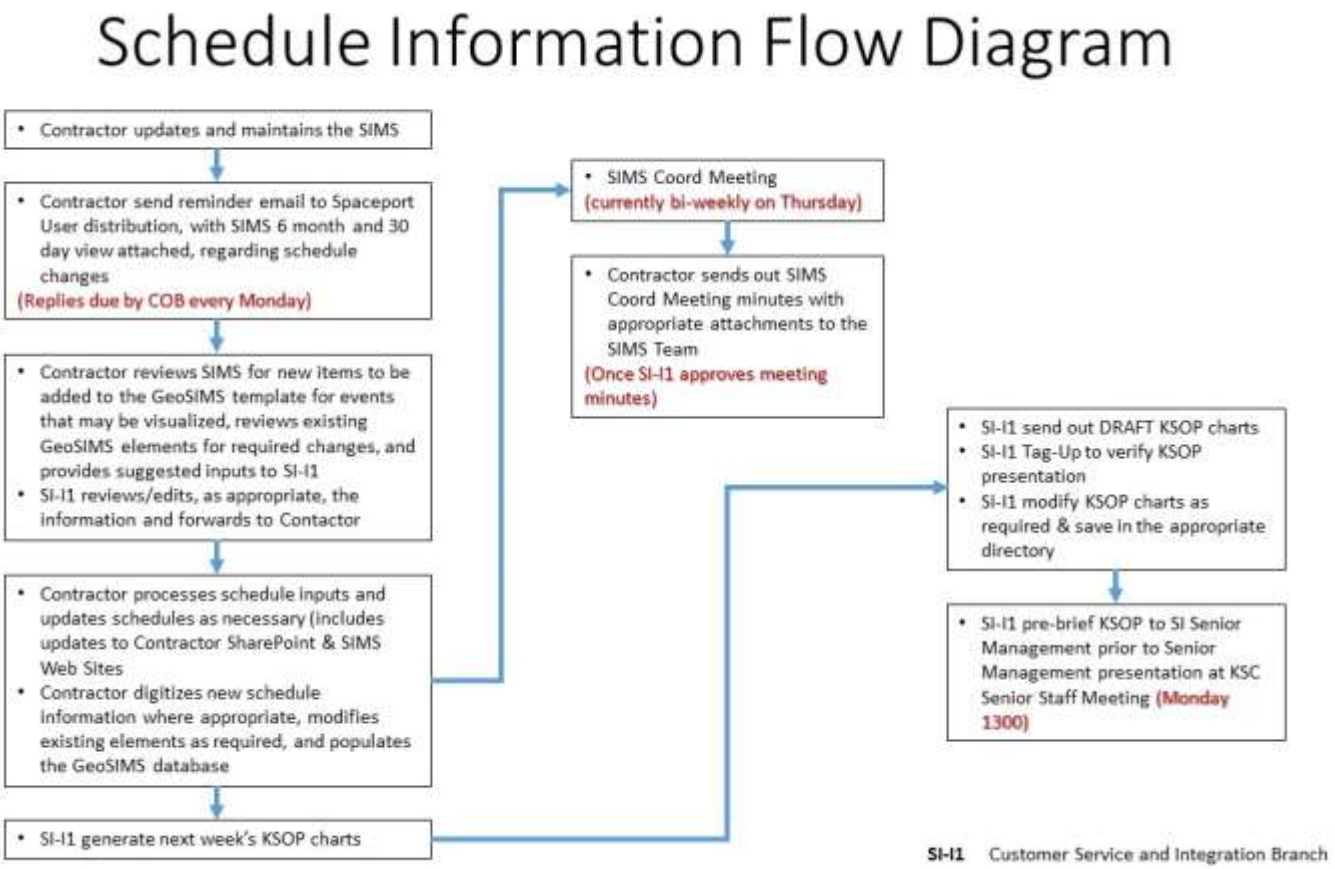

Figure 1 Schedule Information Flow Diagram

3.2 SIMS Coord Meeting

To facilitate the update process, the SIMS Coord meets bi-weekly, expanding to weekly, or more often, as the operations tempo dictates. The SIMS Coord, facilitated by the Contractor, serves as the forum to identify potential conflicts over dates and resources. Conflicts may be resolved at the SIMS Coord meeting, or separate Spaceport user meetings may be initiated to

resolve operational conflicts. Attendees at the SIMS Coord Meeting include the Customer Services and Integration Branch Master Integrator, Customer Services and Integration Branch Customer Advocates, and representatives from each Spaceport user.

4.0 Federal Aviation Administration (FAA)-LICENSED, COMMERCIAL LAUNCHES

The Customer Services and Integration Branch is responsible for the scheduling and coordination of all FAA-licensed commercial launches from the Spaceport. If not already accomplished, commercial launch providers desiring to conduct launch operations will work through KDP-KSC-P-1864, KSC Center Planning and Development Partnership Development Process, to establish a launch agreement. Once a launch agreement is in place, commercial launch providers will utilize the TOR Process documented in KDP-KSC-P-9090, Task Order Request and Task Plan Process, to request Spaceport resources to support a desired launch activity and its associated operations or tests. Should commercial launch providers require support from the ER, they will work through the ER Scheduling Office using ER processes to request those resources. Once the TOR has been submitted, a pending launch date and launch window may be established on the SIMS; normally at least three months in advance of the required support. Requests received with less than a 30-day notice will be accommodated when possible as resources and processing time allows.

When ER resources are required to support a given FAA-licensed commercial launch from the Spaceport, the ER will be cognizant of the launch date/window through their normal scheduling process. When the commercial launch provider does not require ER resources, the Customer Services and Integration Branch employee(s) who participates in regularly scheduled weekly meetings with the ER will communicate launch dates/windows to ensure there are no conflicts or overlapping safety clears.

When appropriate, the Customer Services and Integration Branch will inform representation from the ER Scheduling Office of the FAA-licensed commercial launches that are being planned for the upcoming period of report.

5.0 SCHEDULING PRIORITIES

5.1 Conflict Resolution

The Customer Services and Integration Branch and their support contractor serves as the Spaceport's impartial integrator, ensuring operations activities are supported to the maximum extent possible. As conflicts arise over critical resources, or when clears for hazardous operations overlap, the following methodology should be followed. The team is committed to a timely response achieved at the lowest level possible.

a. ER Scheduling Office, resource provider, or hazardous operations requests will be scheduled on a "first-come, first-served" basis

b. An effort will be made to resolve conflicts between resource providers, requesting users, and relevant stakeholders in accordance with the resource provider's capabilities and rules along with the requestor's agreements

c. The Customer Services and Integration Branch Customer Advocates will assist in the facilitation of an acceptable solution when necessary

d. In the event the Customer Advocates are unable to partner an acceptable resolution to the conflict, the issue will be elevated to the appropriate senior manager for the entities having the conflict (e.g., Program Manager or Launch Director) for resolution

e. As necessary, the Center Director and Commander of the 45th Space Wing will have the final authority for their respective resources

5.2 Prioritization Philosophy

Spaceport resources are generally allocated on a “first-come, first-served” basis so that the maximum number of operational requirements can be supported safely and efficiently. Items which conflict with a shared resource will be coordinated with the affected parties to negotiate a final prioritization plan and scheduled accordingly, utilizing existing processes and agreements. The following items will be considered to aid in determining priorities at the Spaceport:

a. Support required for approved launch dates or returning spacecraft

b. Support for critical-path-operations in preparation for launch or landing/recovery (e.g., static fire testing, wet dress rehearsal, or system verification/validation)

c. Critical corrective maintenance required on facilities or facility systems

d. Continuity of existing test plan and use of similar resources

e. Support for the established schedule

f. Maintenance requests

The prioritization philosophy employed will typically be that launch and landing/recovery operations, major milestone/critical path test operations, and associated pre-launch/pre-landing checkouts have the highest priority and take precedence over non-launch/landing operations.

APPENDIX A: Open Work

A1.0 To Be Determined (TBD)

Table A-1 lists the specific TBD items in the document that are not yet known. The TBD is inserted as a placeholder wherever the required data is needed and is formatted in bold type within brackets. The TBD item is numbered based on the section where the first occurrence of the item is located as the first digit and a consecutive number as the second digit (e.g., **<TBD 2-1>** is the first undetermined item assigned in Section 2 of the document). As each TBD is solved, the updated text is inserted in each place that the TBD appears in the document and the item is removed from this table. As new TBD items are assigned, they will be added to this list in accordance with the above described numbering scheme. Original TBDs will not be renumbered.

Table A-1 TBD Items

TBD	Section	Description
None		

A2.0 To Be Resolved (TBR)

Table A-2 lists the specific TBR issues in the document that are not yet known. The TBR is inserted as a placeholder wherever the required data is needed and is formatted in bold type within brackets. The TBR issue is numbered based on the section where the first occurrence of the issue is located as the first digit and a consecutive number as the second digit (e.g., **<TBR 2-1>** is the first unresolved issue assigned in Section 2 of the document). As each TBR is resolved, the updated text is inserted in each place that the TBR appears in the document and the issue is removed from this table. As new TBR issues are assigned, they will be added to this list in accordance with the above described numbering scheme. Original TBRs will not be renumbered.

Table A-2 TBR Issues

TBR	Section	Description
None		

APPENDIX B: Acronyms

ER	Eastern Range
FAA	Federal Aviation Administration
GeoSIMS	Geospatial Spaceport Integrated Master Schedule
KSC	Kennedy Space Center
KSOP	Kennedy Spaceport Operations Picture
mW	Milliwatts
NASA	National Aeronautics and Space Administration
RF	Radio Frequency
SI	Spaceport Integration and Services Directorate
SIMS	Spaceport Integrated Master Schedule
SIMS Coord	Spaceport Integrated Master Schedule Coordination
SI-TV	SI-Television
Spaceport	KSC Multiuser Spaceport
TBD	To Be Determined
TBR	To Be Resolved
TOR	Task Order Request

APPENDIX C: Definitions

Class III Laser	Occupational Safety & Health Administration defines Class III Laser as follows: - Class IIIA: intermediate power lasers (continuous wave: 1-5 mW). Only hazardous for intra-beam viewing. Some limited controls are usually recommended. - Class IIIB: moderate power lasers (continuous wave: 5-500 mW, pulsed: 10 J/cm2 or the diffuse reflection limit, whichever is lower). In general Class IIIB lasers will not be a fire hazard, nor are they generally capable of producing a hazardous diffuse reflection. Specific controls are recommended.
Class IV Laser	Occupational Safety & Health Administration defines Class III Laser as follows: - Class IV: High power lasers (continuous wave: 500 mW, pulsed: 10 J/cm2 or the diffuse reflection limit) are hazardous to view under any condition (directly or diffusely scattered) and are a potential fire hazard and a skin hazard. Significant controls are required of Class IV laser facilities.
First Responder	KSC Fire/Rescue or KSC Security forces.
RF Restriction	Restricts the power output at a specific site (e.g., GPS IIF-12 RF Restriction Area 59 has a restriction of not more than 20 V/M.
RF Silence	Requires appropriate transmitters turned off. Generally, this refers to radars and, if needed, Command transmitters, depending on the requirements of the silence.
Spaceport	Simplified term used throughout the document referring to the Kennedy Space Center Multiuser Spaceport
Spaceport User	Any customer using the Spaceport; this includes, but is not limited to: - NASA - Department of Defense - Other Government - Commercial